

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC

In the matter of

Implementation of Local Competition
in the Telecommunications Act
of 1996

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Docket No. 96-98

Declaration of Robert W. Crandall¹

1. I am a Senior Fellow in Economic Studies at the Brookings Institution, a position that I have held since 1978. Prior to that I served on the Council on Wage and Price Stability as Deputy Director and Acting Director. I have held faculty positions in economics at M.I.T., the University of Maryland, and George Washington University and have taught in Stanford University's Washington Program. I served as an advisor to FCC Commissioner Glen O. Robinson and have been a consultant to the Commission on several occasions. I have written widely on communications issues over the past 25 years. My most recent books in this area are After the Breakup: The U.S. Telecommunications Sector in a More Competitive Era (Brookings, 1991); Talk is Cheap: The Promise of Regulatory Reform in North American Telecommunications (with Leonard Waverman, Brookings, 1996); and Cable TV: Regulation or Competition? (with Harold Furchtgott-Roth, Brookings, 1996).

2. I have been asked by Bell Atlantic to provide an analysis of certain issues raised by the

¹ The views expressed herein are those of the author and do not necessarily represent those of the Brookings Institution, its Trustees, or other staff members.

Commission's Notice of Proposed Rulemaking in this proceeding. In these comments, I focus only on the economic issues involved in pricing resale, interconnection and unbundled rate elements under Section 251 of the Act.

Summary

3. The new Telecommunications Act establishes a number of new unbundling, interconnection and pricing requirements on incumbent local telecommunications carriers that the Federal Communications Commission and state regulators will have to implement with great care because of existing local rate structures. These rate structures have not traditionally been based on the cost of service, but have instead reflected the judgments of regulators that business subscribers should subsidize residential subscribers, that urban subscribers should subsidize rural subscribers, and that heavy users of interexchange services should subsidize local subscriber dialtone line rates. The rates established for unbundled elements, interconnection, and resale of local service -- if set equal to economic costs, as some parties here have argued -- will inevitably set in motion substantial arbitrage that will undermine the existing rate structure and could even imperil some local exchange carriers. Failure to consider how these provisions interact with one another and with the existing rate structure in the more competitive era mandated by the Act could have very serious, indeed, even dramatic consequences.

Sources of Competition

4. The 1996 Act requires states to allow competitive entry into intrastate telecommunications markets. It foresees the entry of facilities-based carriers and requires that

they be allowed to interconnect with incumbent carriers. But entrants may also choose to enter with only some of their own facilities and lease "unbundled" network elements from the incumbent carrier to complete their networks. Finally, entrants may simply purchase the entire service at "wholesale" rates, reselling the service to retail customers at a markup over the wholesale price of the regulated, incumbent carrier.

5. Given rate structures that do not reflect relative costs in most states, the possibilities for arbitrage by entrants are numerous. In an unregulated market where incumbents are free to adjust their rates in response to partial or full entry, such arbitrage activities are not likely to be adverse to economic welfare. However, if the new competitors in local telecommunications markets, the CLECs, are free to exploit the arbitrage possibilities and the incumbents cannot respond by adjusting all of their various rates, particularly those that have been held far below cost by state regulators, a variety of inefficient outcomes will occur and the incumbents' ability to recover their costs will be in jeopardy.

Wholesale versus Retail Rates

6. I begin with simple resale. Under the Act, local carriers are obligated to establish wholesale prices on the basis of retail rates, but excluding the portion attributable to those costs that are avoided by offering the service wholesale rather than retail. However, in most states, at least some -- if not all -- retail residential dialtone line rates are likely below the incremental cost of providing the service and surely below average embedded costs. As of December 1994, for example, the Bell Operating Company (BOC) in all but eight states had retail residential dialtone

line rates for its smallest exchanges² that were less than \$15 per month, or less than \$180 per year.³ Given embedded accounting-based non-traffic sensitive costs of about \$260 per line per year for the average local-exchange carrier,⁴ it is exceedingly unlikely that these very low retail rates would cover the incremental cost of service for these exchanges, which typically have the longest average subscriber loop lengths.⁵ Business flat rates are typically higher, but even some of these may be below long-run incremental cost (LRIC) of dialtone line service.

7. In many states, even the retail dialtone line rates for residential service in urban areas may be below even incremental cost. For example, the BOCs in thirty states had residential flat rates for their largest exchanges, i.e., those in the largest cities with the most subscriber lines, that were less than \$180 per year at the end of 1994. Although the loop lengths on average tend to be shorter for these exchanges than for those in rural areas, \$180 per year may still be below incremental cost for this service. In these cases, requiring the LECs to offer wholesale prices that reflect a discount from retail is to require the incumbent LECs to subsidize the construction and maintenance of local facilities for new competitors. This subsidy would discourage the

² Those with the fewest lines and, therefore, those likely to be located in small communities with low population density.

³National Association of Regulatory Commissioners, Bell Operating Companies Exchange Telephone Operating Rates, December 31, 1994.

⁴National Exchange Carrier Association data as reported in the annual FCC, Monitoring Report. (The latest data are for 1993 and reported in the May 1995 Monitoring Report.)

⁵Even one of the lowest estimates of TSLRIC, provided by Hatfield Associates for MCI, finds that the TSLRIC for all elements of the local loop is more than \$40 per month for the 5 percent of loops in the least densely populated areas, (See Hatfield Associates, Inc., The Cost of Basic Network Elements: Theory, Modeling, and Policy Implications, March 1996)

construction of new facilities by entrants even if such facilities could be built and operated for less than the incumbents' facilities.

8. Obviously, wholesale rates for most services other than simple local exchange services must be above their relevant incremental cost because these services generate the current subsidies for the nonremunerative services and cover the joint and common costs of operating the LECs' networks. If resellers are able to purchase parts of the incumbent's local service, such as dialtone line service, and offer their own additional or "vertical" services, incumbents could be forced to offer the basic local exchange services substantially below cost -- average embedded cost or incremental cost -- with little hope of recouping this deficit through other services. There will likely be little wholesale demand for these more remunerative services, since entrants will quickly begin to build their own facilities to offer them. For instance, facilities will eagerly be built by entrants so they can offer call-waiting and other vertical services or intraLATA toll services that are now typically priced above forward-looking economic costs. If the LECs are now forced to offer for resale only a portion of the local service -- the basic connection -- at a wholesale rate to entrants who then bundle this subsidized service with their own profitable vertical services, the distortions referred to above will clearly be exacerbated.

9. For these reasons, the Commission and the states will have to proceed carefully in establishing rules for wholesale rates. Obviously, the best approach would be to rebalance rates so that no service rates are below the relevant measure of cost. Alternatively, until such rebalancing is accomplished by regulators or forced by competitors, and to the extent incumbent

LECs are inefficiently required to offer services at wholesale prices that are below incremental cost, the incumbents should receive the universal-service subsidies for these subscriber lines.

Pricing Unbundled Elements, Call Termination, and Interconnection

10. The new Act requires incumbent LECs to provide access to unbundled network elements at technically-feasible points. The charges for the use of such elements must be "just and reasonable." From an economic standpoint, the pricing of any network function, whether for termination, interconnection, or any other purpose, should be based on long-run incremental costs, but such pricing should be regulated in the context of a carrier recovering its total costs. Because the pricing of services or elements at long-run incremental cost will likely leave the carrier far short of covering its fixed and/or common costs, even on a forward-looking basis, LRIC must be marked up to allow for full cost recovery including a return on the requisite capital if the sum of LRIC-based rates do not cover all forward-looking costs. Under this condition, the pricing of any element, of call termination, or of interconnection should not be considered in isolation. The degree of mark-up over LRIC of each should be determined on the basis of its effect on overall economic welfare.

11. As I explain below, the measure of LRIC on which rates should be based is the cost of building and operating actual LEC networks, not hypothetical new networks that do not exist today and may never exist. If LECs are to continue as regulated entities, their rates must be based on the costs of operating the networks that they have been permitted to build under regulation.

12. It is particularly important that call termination charges or interconnection charges not be set at zero -- so-called "bill-and-keep" -- on the basis of some hypothetical notion that a carrier's in-coming and out-going services are in rough "balance." A zero charge for any service whose LRIC is positive is clearly inefficient and will create the wrong incentives for building and operating facilities. Moreover, a zero charge for interconnection serves to subsidize those entrants that operate with a large surplus of out-going traffic.

13. If the current system of interexchange origination and termination rates -- "access" charges -- is continued while interconnection rates and the rates on unbundled elements are set at or near actual cost, very strong incentives will be created for other carriers or large customers to divert interexchange calls through competitive networks, disguising interexchange traffic as interconnected local traffic. To prevent such arbitrage and potentially uneconomic bypass, the Commission and state regulators must move rapidly to rebalance rates and to reform the existing access charge regime. But until this rebalancing occurs, the Commission and state regulators must enforce prohibitions against bypassing the current interstate and intrastate access charges levied on toll calls.

Embedded Versus Forward-Looking Costs

14. The 1996 Telecommunications Act does not establish whether the rates for unbundled services and interconnection should be based on actual embedded costs, LRIC, or TSLRIC (total-service long-run incremental cost). There could be very large differences among these

measures for various network functions, and these differences could be magnified by the fact that forward-looking costs -- such as LRIC or TSLRIC -- necessarily involve engineering judgments about the cost of constructing optimal networks or expanding current networks under current prices and technology.

15. It is important that the Commission and state authorities recognize that the rates for unbundled elements and interconnection are still regulated rates unless the interconnection rates are the result of negotiation between the incumbent and entrants. The regulators will therefore be faced with a choice: relying on the actual embedded accounting costs of the incumbents or arbitrary, hypothetical engineering-economic analyses of forward-looking costs, such as LRIC or TSLRIC. There are simply no market analogues for LRIC or TSLRIC. Indeed, the advocates of using such measures are often precisely those firms who wish to enter local telecommunications markets by relying upon incumbents' networks, not by building the networks that would generate measures of LRIC and TSLRIC.

16. There is moreover no way to know what these hypothetical, competitive networks look like. Are they wireless networks? Or are they fiber-coaxial cable networks, capable of offering switched video, data, and voice services? If we are to believe one study already placed in this record,⁶ these new networks from which TSLRIC estimates are to be derived are simply hypothetical efficient, modern replications of existing local-telephone company networks.

⁶ I refer to the Hatfield study cited in fn. 5, above.

Unfortunately, there is simply no evidence that such hypothetical networks would represent an efficient use of society's resources. If this were not the case, someone would be building them. In short, the use of forward-looking estimates of costs, such as TSLRIC, requires regulators to know better than the market what are truly efficient network designs. This is surely a debatable and even dangerous assumption.

17. If the Commission chooses to adopt the forward-looking approach of TSLRIC in guiding the rate-making process for unbundled elements and interconnection, it should at least require that the hypothetical estimates of TSLRIC include all of the joint and common costs that would be required for even a new, modern carrier. For instance, the Hatfield study that has been submitted in this proceeding attributes less than 10 percent of current LEC customer-service and corporate operations costs to the TSLRIC of network operations. The remainder reflects more than half of the gap between embedded costs and its estimate of TSLRIC.⁷ Given that this calculation is based on the operation of a hypothetically "efficient" new network, there is no real-world operational basis for this assumption. To establish rates for unbundled elements and interconnection on the basis of these hypothetical and necessarily arbitrary calculations of overhead and customer-service costs is obviously a precarious enterprise.

18. The 1996 Act establishes a new framework for local competition in telecommunications. Local telephone companies may no longer operate as franchised

⁷Hatfield, op.cit., p. 36.

monopolists subject to oversight by state commissions. As new entry occurs and the incumbents are forced to unbundle their networks and offer interconnection with other carriers, the risk to their shareholders rises markedly. Therefore, in calculating any forward-looking measure of costs, the estimate of the costs of capital must necessarily rise as well. It would be incorrect to assume that one can calculate LRIC or TSLRIC in this new competitive era by reaching back to old state regulatory proceedings or to any period in the pre-1996 era for estimates of the cost of capital to regulated local carriers. The additional risk to shareholders must be factored into these estimates of the cost of capital.⁸ However, the Hatfield study offered by MCI in this proceeding uses a cost of capital of less than 10 percent, based on an estimated cost of equity capital of only 12 percent. Given the riskiness to investors in LEC equities in the post-1996 Act environment, this assumed cost of capital would appear to be perilously low.⁹

Conclusion

19. In this proceeding, the Commission is attempting to guide the states' regulation of rates for unbundled elements, interconnection, and wholesale services. It does so against the background of a current rate structure that has not been set with reference to relative costs. Therefore, it must proceed cautiously in providing such guidance because the new rates for unbundled elements and interconnection could unleash powerful forces of arbitrage that would

⁸ This risk is likely to be reflected in higher borrowing rates (for bonds) and higher returns on the needed equity to reward stockholders for assuming this new risk from competition.

⁹ Indeed, the estimated Beta coefficient -- a widely used measure of relative risk -- for most LECs has been rising for some time, reflecting the market's judgment that the riskiness of local-exchange operations is rising in the increasingly-competitive telecommunications sector.

leave the local carriers with a preponderance of services that are priced by regulators below the carriers' costs and few services from which this deficit could be recovered. In particular, the local carriers should not be forced to offer wholesale services to new entrants at rates that are below their own costs while the new entrants package these subsidized services with the more profitable enhanced and interexchange services. The obvious solution to many of these problems is for the states to rebalance rates towards costs, but until such rebalancing occurs the Commission must be careful not to establish policies that would discourage efficient network investments by regulated carriers.

20. In establishing the cost methodology for calculating rates for interconnection or unbundled elements, the Commission should be aware of the dangers of adopting forward-looking approaches that allow it to be submerged in a sea of hypothetical engineering analyses of network costs based on networks that do not now exist. Clearly, in a competitive market, rates would fall to market-determined forward-looking costs, but these market-determined rates may not be the same as those provided by hypothetical engineering analyses. The Commission has trod this road before and veered away from reliance upon engineering analyses of costs provided by interested parties. At the very least, the Commission should provide guidance for the states clarifying that joint and common costs should be included in estimates of these forward-looking costs. Otherwise, the Commission risks the establishment of new barriers to efficient competitive entry, as entrants simply poach on the established carriers and decide that they cannot build the efficient new networks at the hypothetical costs proffered by their consulting engineers.

I, Robert W. Crandall, declare upon penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Robert W. Crandall 5/16/96
Robert W. Crandall

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Implementation of the Local)	CC Docket No. 96-98
Competition Provisions in the)	
Telecommunications Act of 1996)	
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Declaration of Raymond F. Albers

I, Raymond F. Albers, declare as follows:

1. I am Vice President - Technology Planning for Bell Atlantic. I am responsible for network systems development, systems integration, services technical planning, network technology deployment planning and advanced technology support for the Bell Atlantic network. I also serve as Chairman of the Network Reliability Steering Committee of the Alliance for Telecommunications Industry Solutions (ATIS).

2. The purpose of my statement is to describe the basic interconnection arrangements, network elements, and other services that Bell Atlantic currently makes available for co-carriers intending to offer local service. They include services that are already widely available, and other network elements -- in particular loops, ports, and transport -- that co-carriers seeking to enter the local exchange market have consistently requested. I also discuss current technical and operational limitations that make the unbundling of additional network elements that have been suggested in connection with this proceeding -- such as loop sub-elements and switching platforms -- technically and

operationally infeasible at this time. Finally, I discuss the role that the bona fide request process, involving negotiations between subject matter experts and technical trials, currently plays in network and service development and how a similar process is appropriate for development of any additional unbundled network elements that may be required to meet legitimate service and business needs of co-carriers.

Basic Requirements

3. Bell Atlantic offers the following interconnection arrangements, services, and unbundled network elements to co-carriers. There is no apparent demand for any other arrangements, services, or elements to offer local exchange service.

- Interconnection for the exchange of local traffic at tandem and end offices
- Interconnection for 911, SS7, directory assistance, operator services, Line Information Database (LIDB), and 800 database services
- Entrance facilities, collocation and related services
- Tandem transit arrangements
- Poles, ducts, conduits, rights of way
- Operator services (directory assistance, call completion)
- White pages directory listings
- Additional listings
- Access to telephone numbers
- SS7 Signaling links and STP connections
- Interim local number portability
- Basic unbundled loops (POTS)
- Trunk side local transport
- Basic unbundled switch ports

Facilities-based co-carriers can combine any of the listed elements and services they lack in their own network with their own facilities to provide local exchange service.

Transport and Termination

4. The Commission should generally allow carriers to negotiate technical arrangements for the transport and termination of local calls that best suit their business needs. Those negotiations should take place under the framework of interconnection guidelines that provide interconnecting parties with great freedom to choose how and where they will interconnect, while ensuring that there will be a minimum of reconfiguration of the existing network that serves the public so successfully today.

5. The guidelines should provide that the terminating carrier -- whether that is a LEC or a new co-carrier -- selects the physical points on its own network at which traffic is accepted from an originating carrier (the points of interconnection or POIs) for transport to the called customer. Interconnection for the transport and termination of local calls should occur either at the trunk side of individual end offices for termination of calls on numbers served by that end office, or at the trunk side of any access tandem for termination of calls on numbers served by LEC end offices subtending that tandem, as specified in the nationally-used Local Exchange Routing Guide. These options give carriers the ability to choose the points of interconnection that best suit their traffic volumes and business needs.

6. In cases where more than one access tandem is located in a service area, it is important that all local carriers terminate their traffic at the appropriate access tandem for the called number, as specified in the LERG, or pay the terminating carrier's charges for transporting that traffic to the appropriate access tandem. This transport and termination architecture is known and understood by all carriers. By following the Local Exchange Routing Guide, all carriers will have widely available, standardized information about the location of every other carrier's points of interconnection, ensuring interconnectivity throughout the nation.

Interconnection

7. Interconnection at the trunk- and loop-side of the local switch, at transport facilities, at tandem facilities, and at signal transfer points is technically feasible today. To the extent that interconnection at transport facilities includes meet-point interconnection arrangements, however, there are a number of technical and operational issues that are today negotiated between Bell Atlantic and interconnecting carriers involved in such arrangements.

8. Meet-point interconnection arrangements are complex, particularly where fiber optics, and especially SONET (Synchronous Optical Network) transmission equipment, are involved, and should not be mandated by the Commission. Instead, LECs should discuss meet point arrangements with co-carriers that desire such arrangements. The following major technical and operational issues need to be resolved in connection

with every meet point arrangement, whether between adjacent, incumbent LECs or overlapping, competing carriers:

- Both parties must agree to use compatible equipment.
- Both parties must agree to incur costs to update and upgrade new versions of equipment hardware and software at the same time.
- Both parties must agree on which party has overall responsibility for forecasting, sizing, and provisioning.
- Both parties must agree on which party has responsibility in the event of over- or under- utilization of the facility.
- Both parties must agree to mutually acceptable test access arrangements.
- Both parties must agree to mutually acceptable equipment alarming arrangements.
- Both parties must agree to the circuits the transmission systems will carry. With SONET ring technology this will sometimes include circuits for other carriers.
- Both parties must agree to mutually acceptable record keeping and inventory arrangements.
- Both parties must agree on which party will control, initiate and manage service repair and restoration activities.
- Both parties must agree to mutually acceptable equipment monitoring and performance arrangements.
- Both parties must develop a mutually acceptable assignment of costs, and resulting billing arrangement.

9. The fact that interconnection may have been provided at a particular point by another carrier in the past does not necessarily mean that it is technically feasible for Bell Atlantic to provide interconnection at that same point today. A carrier may have offered such interconnection and withdrawn it because it proved unworkable. Additionally, as technology evolves, new equipment may eliminate points of interconnection that were feasible in the past. If carriers are required to offer interconnection points based on outdated technology, the technological development of the network will be arrested.

10. “Similar network technology” or “similarly structured” networks do not necessarily provide the same capabilities to each LEC. For example, even though a digital switch from Siemens is arguably a “similar network technology” to a digital switch from AT&T, Siemens has announced that its switches will have the ability to provide number portability before switches from other manufacturers. In addition, LECs may seek development of proprietary technology from their equipment manufacturers that other LECs would not be able to purchase and may not even know about. As a result, the fact that LECs use “similar network technology” or have “similarly structured” networks does not mean that an interconnection point or unbundled element that is feasible for one LEC will be feasible for another.

11. Moreover, even where incumbent LECs use identical network technology, their administrative and operational support systems may be quite different. LECs have worked for years to integrate their operational support systems with their networks. As a result, the feasibility of providing interconnection or access to an unbundled network element at a particular point may differ among LECs using the same network technology.

Unbundled Loops

12. An unbundled loop should be defined as a transmission path between the Main Distribution Frame within the LEC’s serving central office and the Rate Demarcation Point (Network Interface Device if installed) of the co-carrier’s end user. The basic unbundled loop is an individual two wire, voice grade, analog circuit with a

frequency range of 300 to 3,000 Hz. An unbundled loop serves one individual subscriber line.

13. This definition is based on the Cooperative Voice-Grade Loop Unbundling Test that was conducted over an eight month period in 1995 by Bell Atlantic - Maryland and MFS Intelenet (The "Loop Unbundling Test."). At the time the Loop Unbundling Test began, Bell Atlantic could not provision such loops and had no way of testing them. Through cooperative joint development efforts Bell Atlantic and MFS created a new service that meets co-carriers' needs and accommodates Bell Atlantic's and the co-carriers' technical and network operations concerns.

14. The parties jointly identified goals, established ground rules, and ultimately developed a list of 175 action items, ranging in complexity from defining an unbundled loop to provisioning multiple unbundled loops through coordinated cutover efforts. Issues considered during the test included the identification and definition of the elements that comprised loop unbundling; assessment of the technical limitations and network reliability/security issues; identification of ordering, testing, provisioning, maintenance and billing requirements; identification of maintenance, billing and support system impacts; and the identification of costs involved in loop unbundling. Phase 1 of the test developed the technical feasibility of providing MFS-I with voice grade, analog loops and allowed both parties to begin to identify the impacts of unbundling on their existing processes. Phase 2 centered on identifying and developing processes for working in an unbundled environment as well as testing additional loop scenarios that were not included

in the original test plan. Phase 2 also included testing the interoperability of a variety of services, including E911, directory listing and database updates, and interim number portability, with unbundled loops.

15. The Loop Unbundling Test established that, in most cases, unbundling the loop is feasible from a technical standpoint. The test showed that an unbundled loop can usually be provided over existing twisted copper pair and universal digital loop carrier (“UDLC”) systems to permit co-carrier voice grade service and to recover from various simulated trouble scenarios. One exception was loops provided using a relatively new technology called Integrated Digital Loop Carrier, in which multiple loops are transported from remote terminals in the field and connected directly to the switching system with a high-capacity digital multiplexed bit stream. In such cases it is necessary to rearrange the loop termination in the field so that it can be carried to the central office on older technology such as copper pairs or Universal Digital Loop Carrier. The test also showed that services such as E911, Directory Listing and database updates, and Remote Call Forwarding can work in conjunction with an unbundled loop.

16. The Loop Unbundling Test also showed that unbundling a loop creates substantial inefficiencies and additional costs. As Bell Atlantic’s Report filed at the conclusion of the test stated:

the real challenge for both parties in this test was to identify and ultimately begin to develop/modify the numerous complex processes, functions, and massive Operations Support Systems that are impacted by the introduction of loop unbundling. Through the test alone, BA-MD identified over 30 mechanized Operations Support Systems that are affected by the implementation of loop unbundling. These include, among others:

ordering, provisioning, inventorying, testing, maintenance, repair, and billing systems.

17. This is not surprising because LECs have been working for years to make their service more efficient and economical. In large measure, this has been accomplished by making the loop hardware and systems, as well as the operations support systems and processes, more integrated from provisioning through maintenance. Unbundling takes these integrated systems and processes and develops new systems and processes to break them into isolated piece parts. For example, essential loop test equipment and procedures that currently work seamlessly for integrated dial tone line service will not work *at all* for unbundled loop service, when the unbundled loop is connected to the co-carrier's switch, rather than to Bell Atlantic's. As a result, Bell Atlantic is working with its outside vendors to develop and install new loop testing equipment and software to test unbundled loops. This additional network investment, caused solely by loop unbundling, is required because unbundling the loop will disconnect the loop facility from the existing integrated and automated Mechanized Loop Testing system, which accesses the loop through Bell Atlantic's switch. Bell Atlantic nevertheless remains responsible for providing a working loop to the co-carrier. Similarly, changes will be required to a variety of existing automated Operations Support Systems that handle activities such as service order, equipment inventory, facility assignment, switch recent change, work force administration, and technician dispatch. In another example, transferring an end user from Bell Atlantic's integrated dial tone line service to a co-carrier's service provided over an unbundled loop without a significant

interruption in service will require additional labor and coordination between carriers that are not currently required to establish the end user service.

Unbundled Loop Sub-elements

18. Unlike basic unbundled loops, loop sub-elements are not available from any LEC, and there have been no technical tests or trials establishing that subloop unbundling can be made technically and operationally feasible. Such unbundling raises complex technical, operational and administrative issues that will affect every local exchange provider's network integrity and service quality.

19. First, no generally accepted industry specifications and national standards for loop sub-elements and the physical interconnection at field sub-element points exist. One of the great strengths of the existing telecommunications network is its conformity with tested specifications and national standards.

20. Second, loop sub-element unbundling would require new forms of interconnection that have not been developed or tested -- but upon initial consideration appear to be impractical. In Bell Atlantic's urban areas approximately 80% of our loops are direct feeder -- without distribution plant -- all the way from the customer's premise to the central office. As a result, there is no logical interface point. The only way to interconnect another carrier would be to splice directly into the feeder cable, but doing so would not allow for test access, reasonable identification of individual circuits, or disconnection and reconnection in a multiple-provider environment without damaging the

physical integrity of the network. Even where Bell Atlantic has both feeder and distribution, interface points (field cross-connect boxes) and controlled environmental vaults have not been designed to accommodate multiple interconnections with multiple co-carriers. New field cross-connect boxes would be needed. These new boxes would have to be capable of housing hardware associated with new test systems and connecting blocks for multiple co-carriers and Bell Atlantic. Internal cabling arrangements within these cross-connect boxes must be developed to allow all carriers to run “jumper wires” to complete the interconnection of their circuits. Separate physical access by carriers only to their portions of these cross-connect boxes, similar to physical collocation requirements in central offices, must also be reflected in the new equipment designs.

21. Third, no operations support systems or practices exist to order, provision, inventory and assign loop sub-elements, and mechanized testing capabilities that work through the Bell Atlantic switch would be virtually eliminated. New loop test systems must be developed that allow testing from centralized test centers, instead of requiring the dispatch of technicians to the field manually to identify, test, and isolate reported potential sub-loop facility troubles. A basic premise underlying all of Bell Atlantic’s operations is that a loop is ordered and installed all the way from the central office to the end user’s location. Sup-loop unbundling will change this fundamental principle. With different beginning and end points for a sub-loop facility, extensive software development will be required to modify operations systems involved with service orders, equipment inventory, facility assignment, customer records, testing, trouble reports, and

physical plant records. This will impact at least thirty of Bell Atlantic's operations systems.

22. Sub-loop unbundling will therefore require substantial hardware and software development work, at an expenditure of time and money that is currently unknown.

There has been no forecast of demand for any of the loop sub-elements -- indeed, in Bell Atlantic's region, no facilities-based carrier has asked for loop sub-elements -- so Bell Atlantic would have to create complex process flows, methods and procedures, without knowing if any of the co-carriers would purchase these sub-elements.

Unbundled Switching Ports

23. The definition of a basic unbundled local switch "port" is a two-wire analog POTS-type line side connection to a LEC end office switch, identified by a terminating Telephone Number and an Originating Equipment number resident in the LEC switch. The end point of the switch port is the horizontal side of the main distribution frame in the LEC's end office. An unbundled port provides:

- telephone number
- on hook and off hook detection
- dial tone
- automatic number identification
- presubscribed interexchange carrier (PIC)
- usage capture
- billing detail
- audible ringing and power ringing
- dial pulse/touch-tone reception and recognition